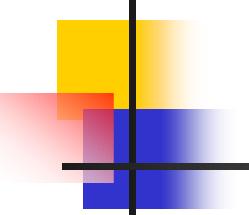


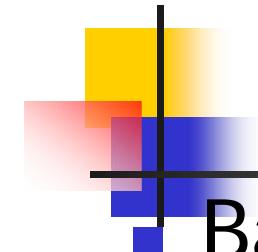
Nutrient Point Source Loads

Scott Macomber
Baltimore Harbor TMDL SAG
December 3, 2002



Overview

- Nutrient Database
- Point Sources
- Draft Data
- Conclusions



MDE Nutrient Database

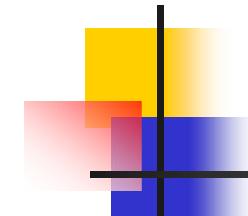
Background

- Database developed to supply info. to the Chesapeake Bay Program watershed and water quality models
- CBP and VIMS models require data for:
 - All parameters
 - All months



Nutrient Database Cont.

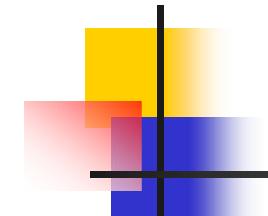
- Data Sources
 - Permit Compliance System (PCS)
 - EPA NPDES compliance database
 - Facility Discharge Monitoring Reports
 - Monthly Operating Reports
 - (POTW's only)



Nutrient Database Cont.

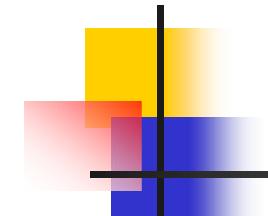
■ Calculation Process

- Data for major dischargers (>0.5mgd) is downloaded from PCS and QA/QC review conducted (DMR value vs. PCS value)
- Data is processed using SAS (Statistical Analysis Systems) software to calculate values for missing data points



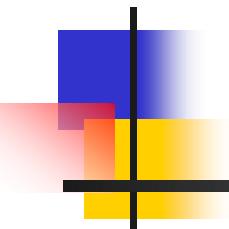
SAS Program

- In circumstances where data is not available –
 - A four step process is employed to calculate values needed for the models
 - 1) If possible, values are generated by difference (i.e, if no NH₃ data than NH₃ = TKN – TON)
 - 2) If not #1, than a mean is calculated using current year data
 - 3) If not #2, the previous years mean value is used
 - 4) In not #3, a default value is inserted (see criteria)

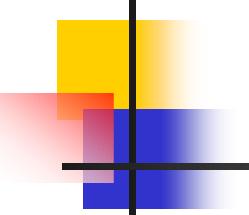


Implications

- Standardization of data handling methods ensures that data used by CBP and VIMS in WQ model development is comparable

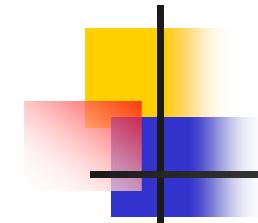


Point Sources



Modeling Point Sources

- ALL point sources will be included in the WQ models (Harbor and Watershed) and receive allocations
- However, ONLY major (>0.5 MGD) sources will be subject to nutrient reductions



Modeling Point Sources

- Harbor Point Sources
- Watershed Point Sources

| | |
|----------------------|-------|
| Grace Davison | Major |
| Bethlehem Steel | Major |
| Patapsco WWTP | Major |
| Cox Creek WWTP | Major |
| US Gypsum | Minor |
| Erachem Comilog | Minor |
| Millennium Specialty | Minor |

| | |
|---------------------------|-------|
| Freedom WWTP | Major |
| Mt Airy | Major |
| Gaither Manor | Minor |
| Woodstock Training Center | Minor |
| Pheasant Ridge | Minor |
| South Carroll High School | Minor |
| Holiday Mobile Estates | Minor |
| St Timothy School | Minor |
| Villa Julie College | Minor |



Point Source Load Estimates for Baltimore Harbor (Major Discharges)

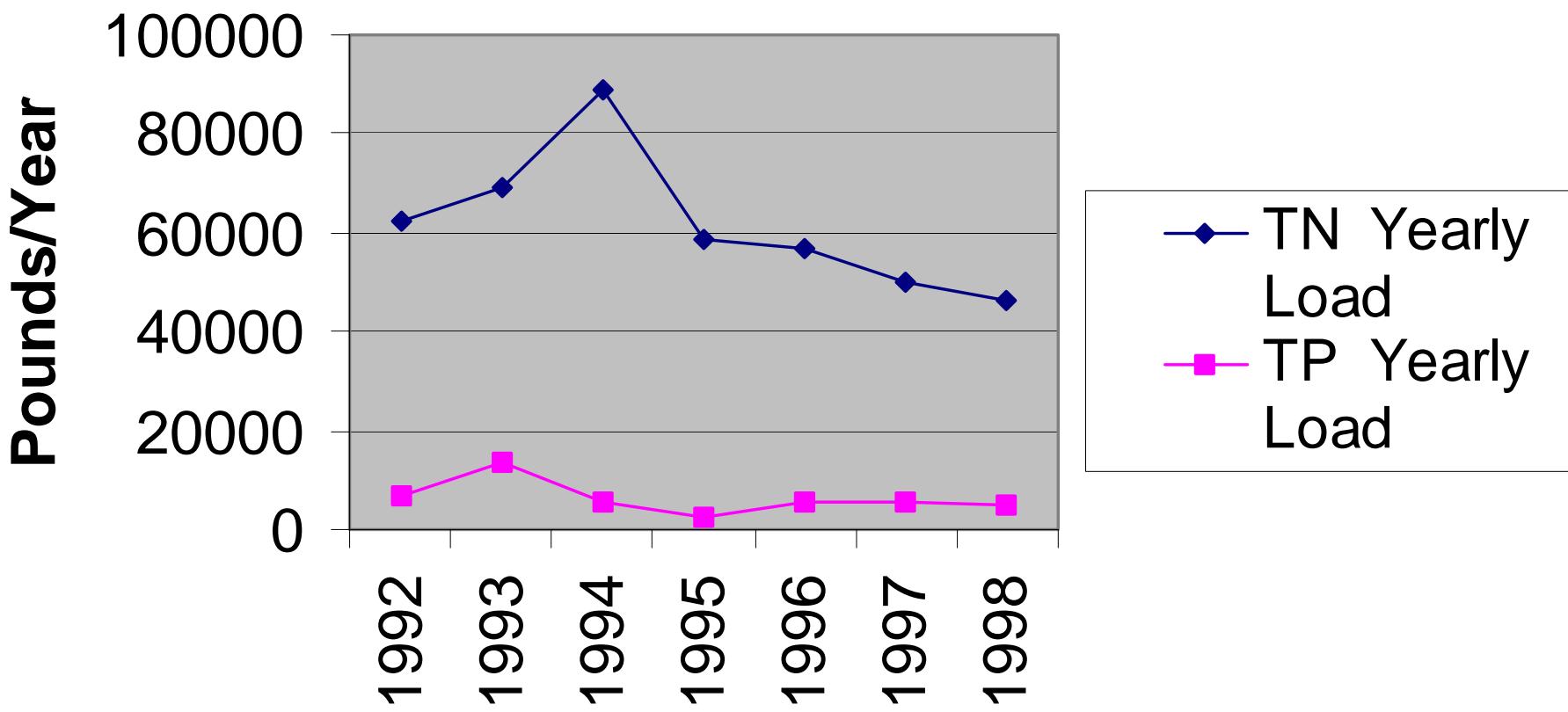
DRAFT



Draft Freedom District WWTP Data

| Year | FLOW | TN | TN | TP | TP |
|------|------|------------|-------------|------------|-------------|
| | MGD | Daily Load | Yearly Load | Daily Load | Yearly Load |
| 1992 | 1.8 | 170.4 | 62193 | 19.3 | 7058 |
| 1993 | 2.1 | 189.7 | 69226 | 36.9 | 13458 |
| 1994 | 2.2 | 243.9 | 89038 | 15.9 | 5787 |
| 1995 | 1.8 | 160.4 | 58554 | 7.3 | 2665 |
| 1996 | 2.0 | 155.2 | 56648 | 15.6 | 5712 |
| 1997 | 1.9 | 137.7 | 50249 | 15.5 | 5656 |
| 1998 | 2.0 | 126.8 | 46294 | 13.1 | 4781 |

Yearly Load Trends at Freedom District WWTP

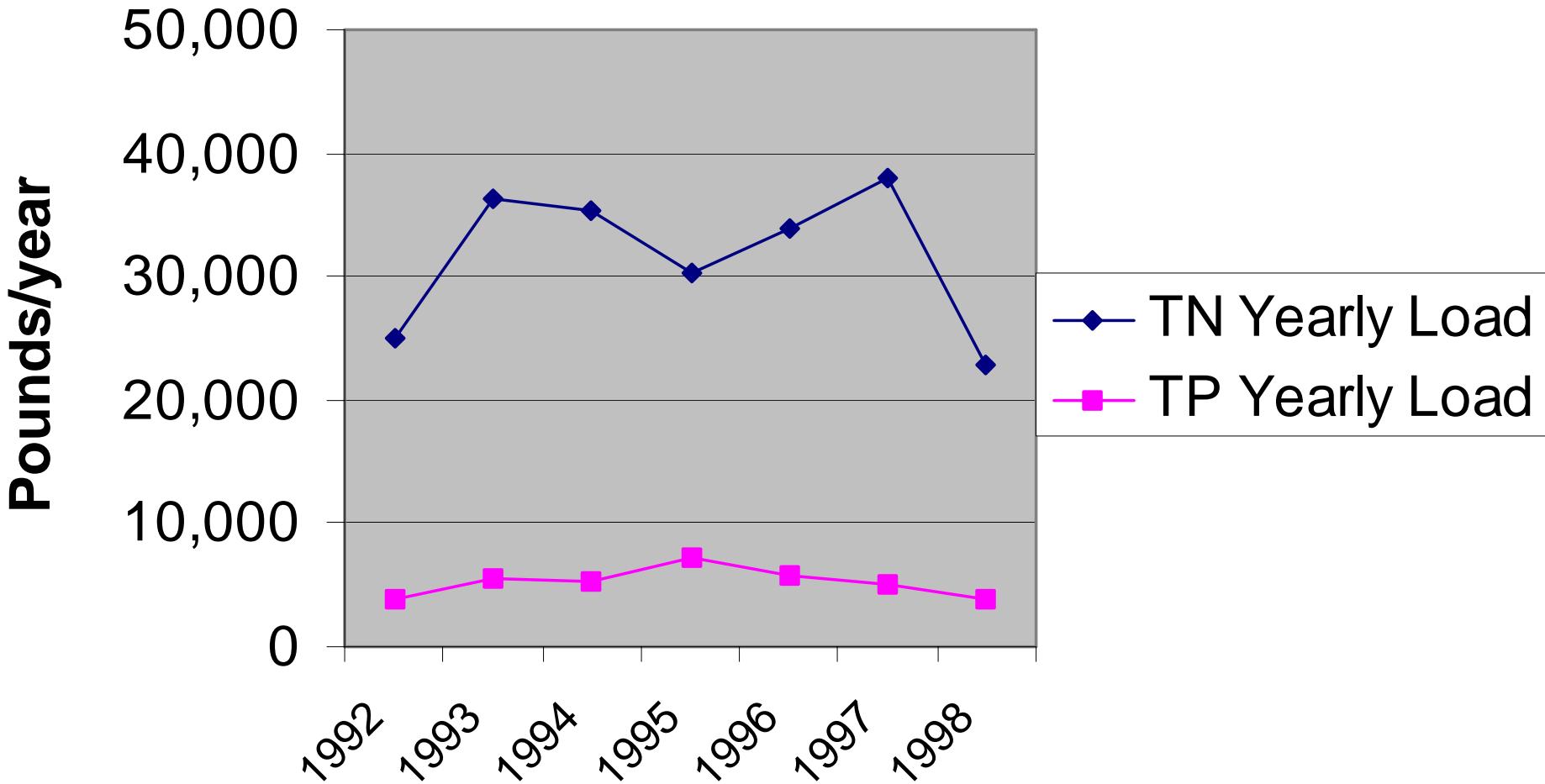




Draft Mount Airy WWTP Data

| Year | FLOW | TN | TN | TP | TP |
|------|------|------------|-------------|------------|-------------|
| | MGD | Daily Load | Yearly Load | Daily Load | Yearly Load |
| 1992 | 0.4 | 68.6 | 25025 | 10.5 | 3818 |
| 1993 | 0.5 | 99.4 | 36277 | 15.2 | 5535 |
| 1994 | 0.5 | 96.6 | 35267 | 14.7 | 5381 |
| 1995 | 0.4 | 82.7 | 30198 | 20.0 | 7295 |
| 1996 | 0.6 | 93.1 | 33967 | 16.0 | 5826 |
| 1997 | 0.5 | 104.3 | 38070 | 13.9 | 5080 |
| 1998 | 0.5 | 62.6 | 22834 | 10.7 | 3900 |

Yearly Load Trends Mt. Airy WWTP

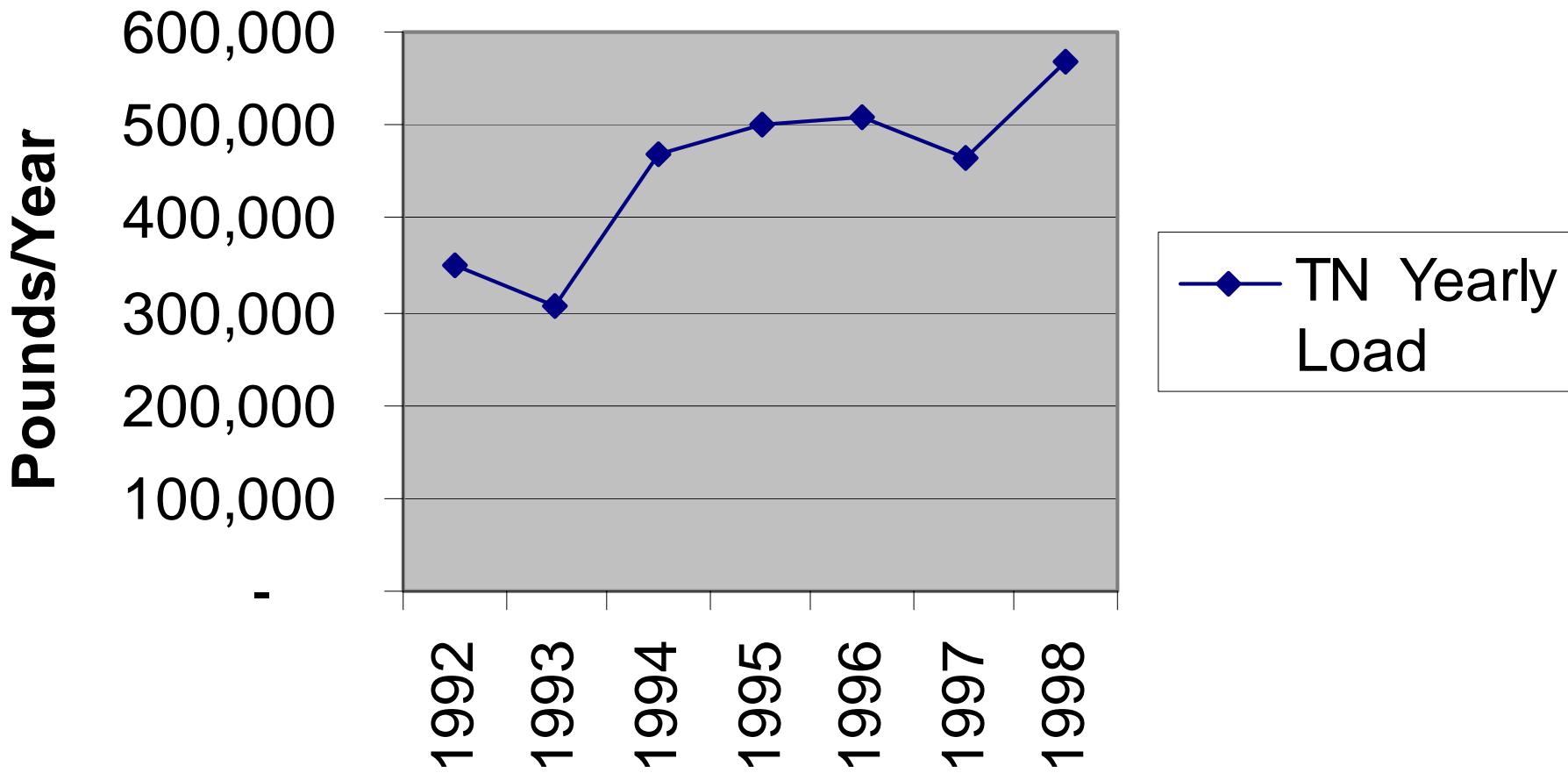




Draft Grace Davison Data

| Year | FLOW | TN | TN | TP | TP |
|------|------|------------|-------------|------------|-------------|
| | MGD | Daily Load | Yearly Load | Daily Load | Yearly Load |
| 1992 | 2.4 | 961.0 | 350,765 | 2.2 | 796 |
| 1993 | 2.6 | 842.8 | 307,611 | 2.4 | 886 |
| 1994 | 2.7 | 1,282.3 | 468,056 | 2.5 | 902 |
| 1995 | 3.0 | 1,370.8 | 500,342 | 10.3 | 3,763 |
| 1996 | 3.6 | 1,397.4 | 510,063 | 3.3 | 1,200 |
| 1997 | 3.6 | 1,269.0 | 463,174 | 8.6 | 3,125 |
| 1998 | 4.1 | 1,554.4 | 567,344 | 18.0 | 6,573 |

Yearly Load Trends at Grace Davison

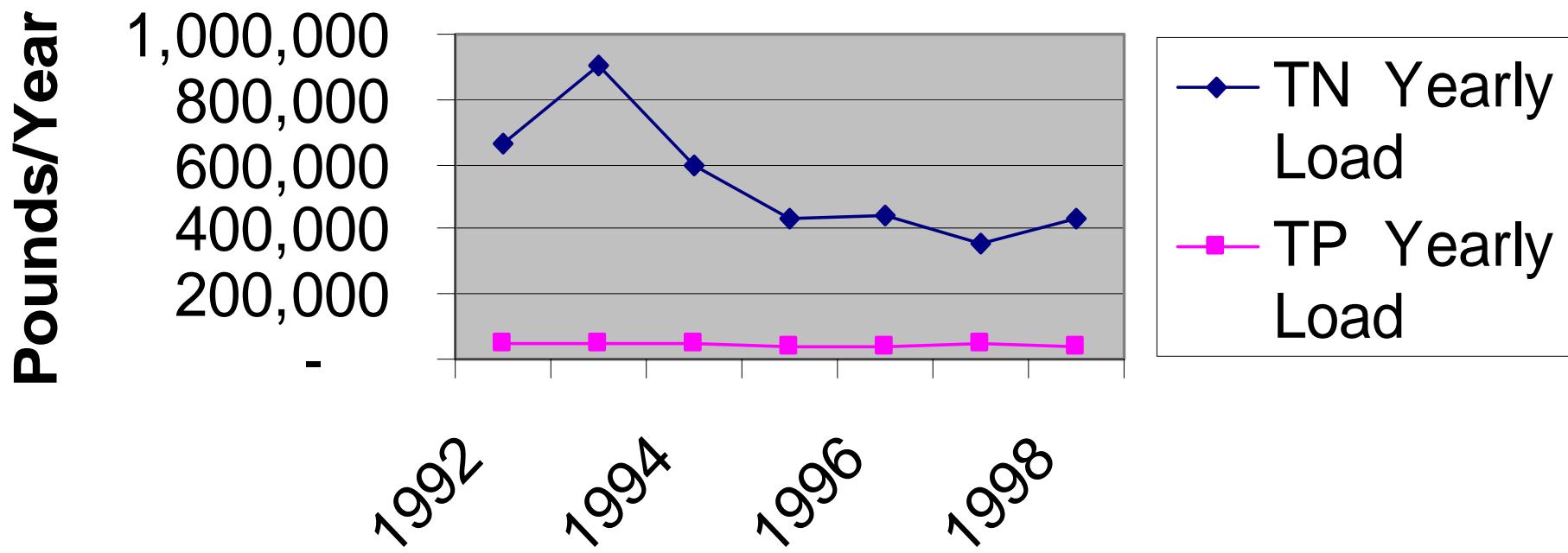




Draft Cox Creek WWTP Data

| Year | FLOW | TN | TN | TP | TP |
|------|------|------------|-------------|------------|-------------|
| | MGD | Daily Load | Yearly Load | Daily Load | Yearly Load |
| 1992 | 11.2 | 1,805 | 658,981 | 142 | 51,740 |
| 1993 | 11.4 | 2,481 | 905,729 | 126 | 45,877 |
| 1994 | 11.4 | 1,634 | 596,246 | 128 | 46,738 |
| 1995 | 10.7 | 1,176 | 429,124 | 114 | 41,471 |
| 1996 | 11.8 | 1,215 | 443,390 | 106 | 38,578 |
| 1997 | 11.1 | 981 | 357,900 | 126 | 46,037 |
| 1998 | 11.0 | 1,178 | 429,883 | 116 | 42,435 |

Yearly Load Trends at Cox Creek WWTP

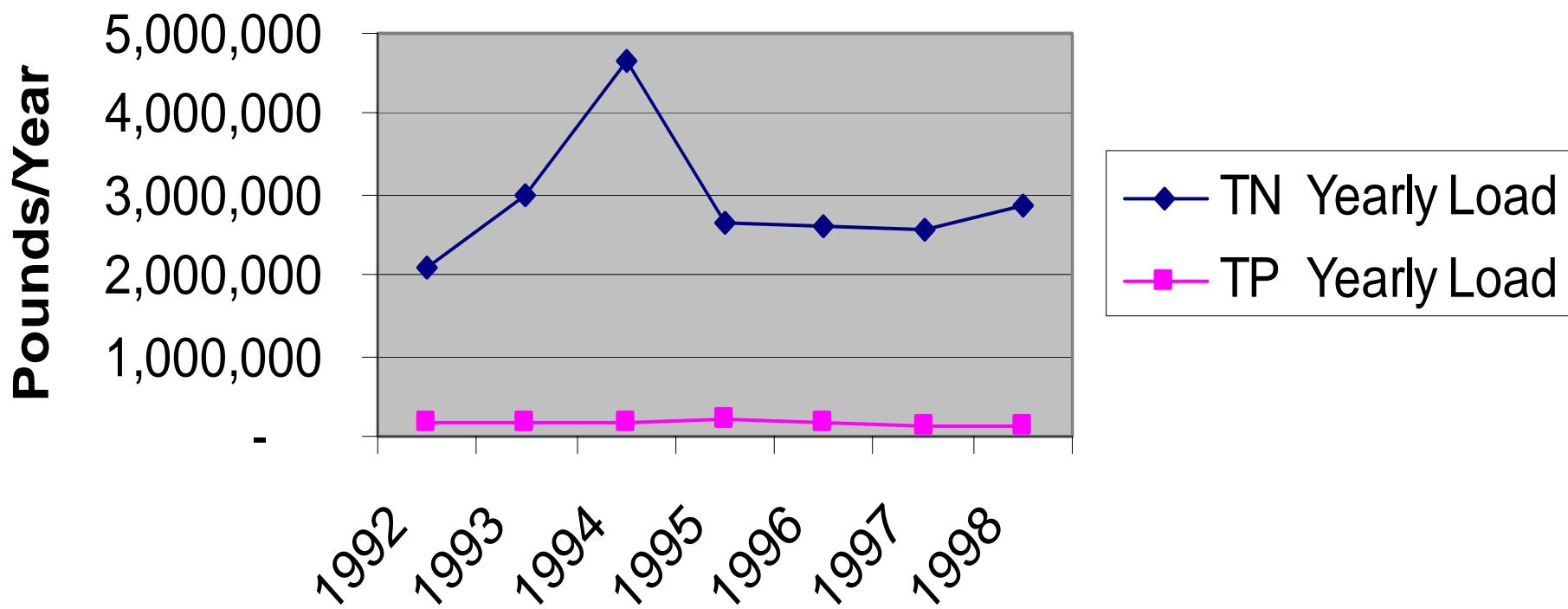




Draft Patapsco WWTP Data

| Year | FLOW | TN | TN | TP | TP |
|------|------|------------|-------------|------------|-------------|
| | MGD | Daily Load | Yearly Load | Daily Load | Yearly Load |
| 1992 | 48.0 | 5,777 | 2,108,624 | 429 | 156,537 |
| 1993 | 52.6 | 8,154 | 2,976,081 | 501 | 182,944 |
| 1994 | 57.4 | 12,798 | 4,671,195 | 487 | 177,739 |
| 1995 | 53.2 | 7,205 | 2,629,959 | 563 | 205,339 |
| 1996 | 63.0 | 7,155 | 2,611,428 | 504 | 183,800 |
| 1997 | 60.0 | 7,035 | 2,567,743 | 341 | 124,334 |
| 1998 | 70.1 | 7,797 | 2,845,972 | 380 | 138,845 |

Yearly Load Trends at Patapsco WWTP

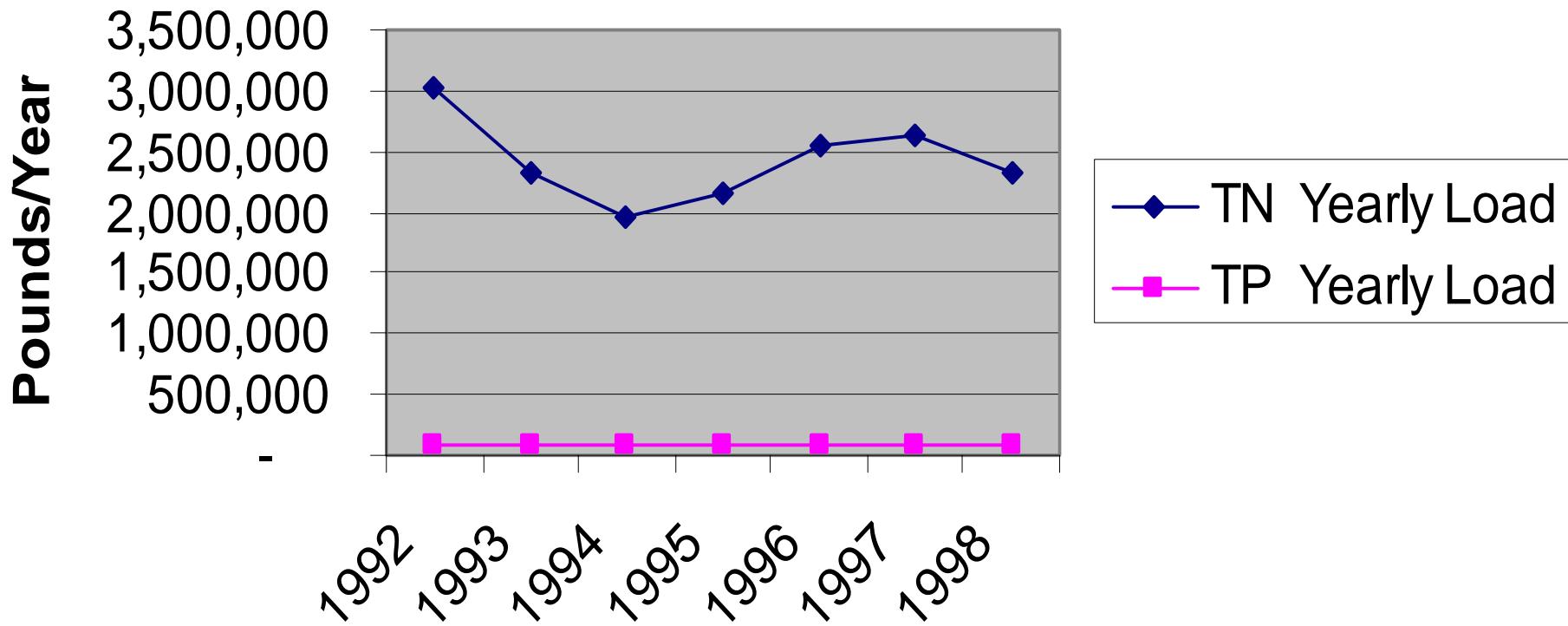




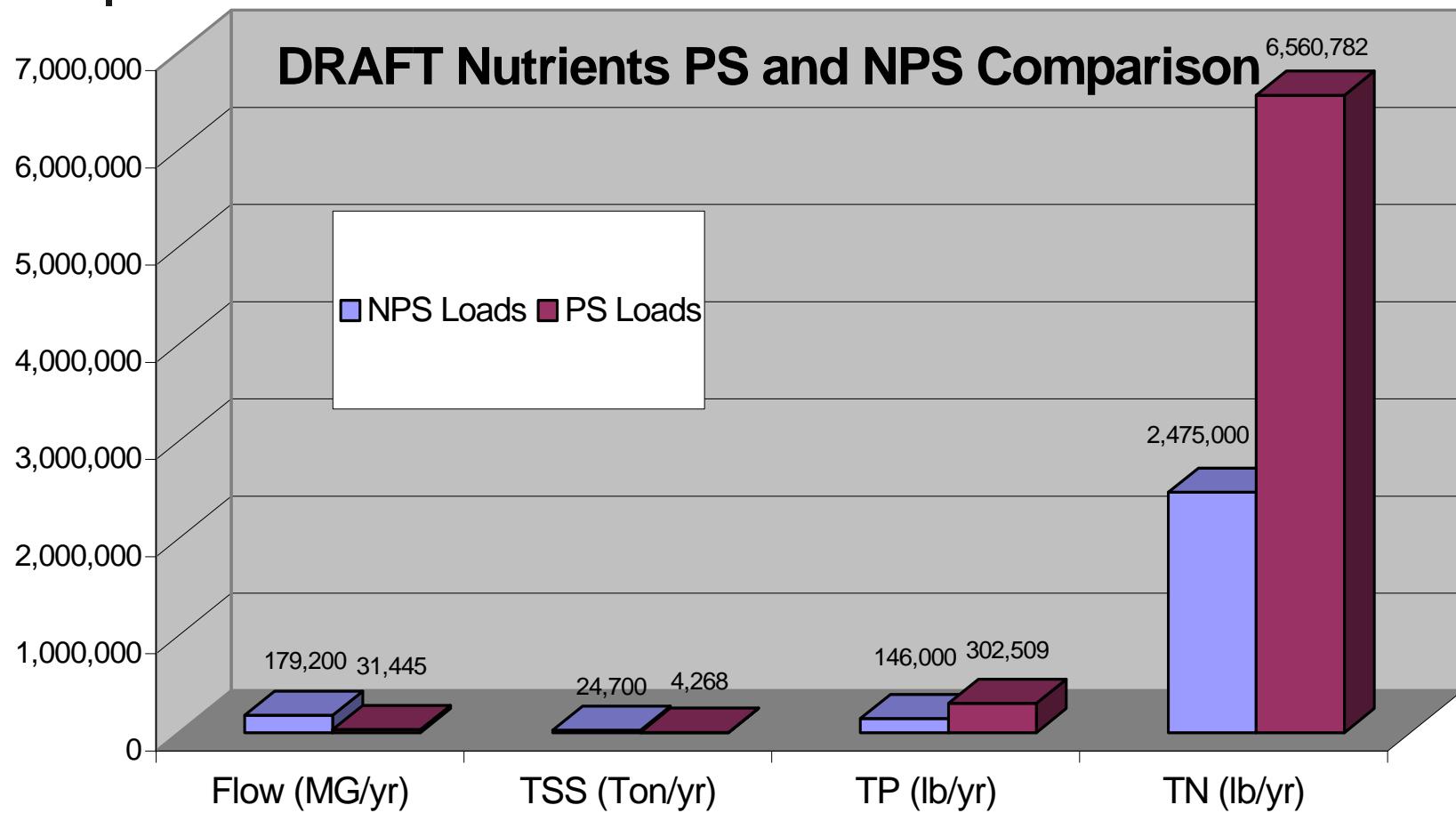
Draft Beth Steel/BR WWTP Data

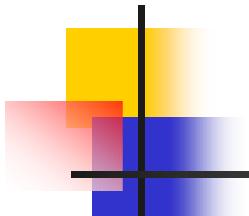
| Year | FLOW | TN | TN | TP | TP |
|------|-------|------------|-------------|------------|-------------|
| | MGD | Daily Load | Yearly Load | Daily Load | Yearly Load |
| 1992 | 107.5 | 8,289.9 | 3,025,796 | 252.8 | 92,275 |
| 1993 | 100.3 | 6,377.8 | 2,327,889 | 238.5 | 87,053 |
| 1994 | 94.9 | 5,381.0 | 1,964,049 | 227.5 | 83,049 |
| 1995 | 84.3 | 5,891.4 | 2,150,362 | 228.1 | 83,267 |
| 1996 | 89.0 | 7,006.5 | 2,557,377 | 245.5 | 89,608 |
| 1997 | 93.7 | 7,224.7 | 2,637,007 | 250.3 | 91,355 |
| 1998 | 90.3 | 6,345.6 | 2,316,157 | 241.1 | 87,993 |

Yearly Load Trends at Beth Steel



Summary Assessment





Future Steps

- Finalize Point Source Values
- Provide to Dischargers for Review
- Make adjustments as needed to values and calibration